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Epicerol® Paper - Biocomposites Conference Cologne (BCC)

Title: Epicerol® - A Bio-based Epichlorohydrin to Further Improve the Environmental Footprint of Composites Through Epoxy Resins

Speaker: Pawin Boonyaporn, Technical Marketing Manager, Advanced Biochemical (Thailand) Co, Ltd

As the global demand for 'green materials' grows, so does the momentum for advanced materials with superior performance and sustainability profiles. Epicerol® is an award-winning bio-based epichlorohydrin (ECH) produced by Advanced Biochemical (Thailand) Co., Ltd. (ABT), which is based on natural and renewable glycerine, instead of propylene. As a 100% bio-based building block, Epicerol® imparts a bio-based content to epoxy resins, which are then used as matrix for composites.

Co-building blocks obtained from nature, for example, cardanol, lignin, rosin, isosorbide, itaconic acid, and gallic acid, are utilized to alter the performance of and to increase the bio-based content of the epoxy resins.

Resins with varying bio-based content can be combined with natural fibres such as flax, hemp and jute, to maximise bio-based content and the use of renewable resources, while minimising the environmental footprint of composites.

Manufacturers in the transportation sector and especially in the automotive industry, are progressively adopting bio-based parts to reduce the environmental footprint as well as lightweight composites, to reduce fuel consumption, while meeting increased design freedom and flexibility requirements. Several prototype cars with high share of bio-based composite parts have been rolled out.

There are also huge opportunities in the leisure industry. Sports and recreational equipment, such as skis, surfboards and bicycles, can benefit from lightweight Epicerol®-based composites. The percentage of consumers willing to pay a price premium to support the development of credible, more sustainable products in this sector is growing.

Composites are replacing traditional construction materials. Here too these materials bring about weight reduction, high strength but



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also design flexibility. The sustainable building standards and the inclination from tenants are helping drive the uptake of the bio-based version of composites into this arena.

Bio-based drop-ins such as Epicerol[®] help to improve the sustainability of composites and reduce the environmental footprint of products with no loss of quality or performance. The glycerine feedstock is an existing by-product from other industries created by the transformation of renewable oils.

A Life Cycle Analysis (LCA) benchmarked the Epicerol[®] process with a state-of-the-art propylene-based process. It demonstrated that Epicerol[®] benefits from 61% reduction of the Global Warming Potential (defined as the sum of GHG emissions and biogenic CO₂ capture) and a 57% reduction of non-renewable energy consumption. Incorporating 1 MT of Epicerol[®] can reduce a product's carbon footprint by 2.56 MT CO₂ equivalent.

ABT partners with leading companies down the value chain who aim to reduce the environmental footprint of raw materials and who valorise Epicerol[®] as a market-competitive bio-based drop-in. In 2015, ABT proudly became the first Biochemical producer in Asia to be certified by the Roundtable on Sustainable Biomaterials (RSB), which demonstrates that it is delivering socially and environmentally responsible bio-chemicals.